

C L A I M S

1. A device for transporting particles containing a magnetic material in a selected direction, the device comprising:

- a support member having a support surface for supporting the particles, the support surface extending in the selected direction;
- a separator magnet arranged to generate a magnetic field for retaining the particles on the support surface whereby the magnetic field on the support surface is arranged to have a high-field band, a low-field band, and a magnetic field gradient in a gradient zone between said high- and low-field bands whereby the magnetic field strength in the high-field band is higher than that in the low-field band;
- means for advancing the high- and low-field bands relative to the support surface in a direction having a component in the direction of the magnetic field gradient on the support surface, whereby the high-field band is followed by the low-field band;

whereby along said high-field band at least a first magnetic pole and a second magnetic pole of opposite polarity are arranged such that a first magnetic path on the support surface from the first magnetic pole to the second magnetic pole is shorter than a second magnetic path on the support surface crossing the gradient zone from the first magnetic pole to any other nearest magnetic pole of opposite polarity.

2. The device of claim 1, wherein the separator magnet is a composite magnet comprising a plurality of magnetic building blocks stacked together in a selected stacking direction.

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3. The device of claim 2, wherein the magnetic building blocks each have a projected N-S axis formed by a component of an internal magnetic field along a plane perpendicular to the selected stacking direction.

5 4. The device of claim 3, wherein the projected N-S axes of the stacked magnetic building blocks intersect the high-field band.

10 5. The device of claim 4, wherein the first magnetic pole and the second magnetic pole are each formed by groups of individual poles of one or more of the stacked magnetic building blocks.

6. The device of claim 4, wherein the first and/or the second magnetic pole is/are formed by a plurality of stacked magnetic building blocks.

15 7. The device of any one of the previous claims, wherein said means for advancing the bands relative to the support surface in the direction having the component in the direction of the magnetic field gradient on the support surface, is provided in the form of drive means for rotating the separator magnet around an axis parallel to the selected stacking direction relative to the support surface.

20 25 8. The device of any one of the previous claims, wherein the gradient zone is helically arranged around the separator magnet.

9. The device of any one of the previous claims, wherein the low-field band corresponds to a recess provided in the outer surface of the separator magnet.

10. The device of any one of the previous claims, wherein 30 the magnetic field in the gradient zone generally increases on a trajectory on the support surface in the selected direction of transport.

11. The device of any one of the previous claims, wherein 35 the support surface extends around the magnet leaving distance between the support surface and the outer

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surface of the separator magnet, whereby said distance in a first location on the support surface is smaller than said distance in a second location on the support surface, the first location being downstream in the

5 selected direction with respect to the second location.

12. The device of claim 11, wherein the support surface is arranged in a tapered fashion around the separator magnet.

13. Tool for excavating an object, the tool comprising a
10 jetting system arranged to impinge the object to be
excavated with a jetted stream of a fluid mixed with
abrasive particles comprising a magnetic material, the
jetting system being provided with at least an abrasive
particle inlet allowing entrance of abrasive particles
15 into the jetting system, the tool further comprising a
recirculation system arranged to recirculate at least
some of the abrasive particles, from a return stream of
the fluid mixed with the abrasive particles downstream
impingement of the jetted stream with the object back to
20 the jetting system, the recirculation system comprising a
device in accordance with any one of the previous claims
arranged with the support surface exposed to said return
stream for transporting the abrasive particles from the
return stream to the inlet.

25 14. The tool of claim 13, wherein the support surface is
provided with a ridge on the support surface guiding the
abrasive particles to the second inlet.

15. The tool of claim 13 or 14, wherein the jetting
30 system is fluidly connected to a bypass conduit arranged
inside the ridge for supplying the jetting system with
the fluid.